**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
**REGION III**
**1650 Arch Street**
**Philadelphia, Pennsylvania 19103-2029**
**June 16, 2009**

Lynne Woodside
Manager Environment and Safety
NGK Metals Corporation
917 US Highway 11 South
Sweetwater, TN 37874

**Subject: Work Plan**
**Laurel Run Ecological Evaluation**

Dear Mrs. Woodside:

The U.S. Environmental Protection Agency (EPA) has received and reviewed the Work Plan, Laurel Run Ecological Evaluation, Former NGK Metals Facility provided by Environmental Standards, Inc. dated May 19, 2009. EPA approves the Work Plan as submitted and looks forward to the initiation of field activities and the results of the sampling activities.

If you have any questions, please contact me at 215-814-2796 or bilash.kevin@epa.gov.

Sincerely,

Kevin Bilash, RPM
Land and Chemicals Division

cc: file

ENVIRONMENTAL STANDARDS
Setting the Standards for Innovative Environmental Solutions

May 19, 2009

Kevin Bilash
US EPA Region III
Land & Chemicals Division 3LC30
1650 Arch Street
Philadelphia, PA 19103

**Re: Work Plan for an Ecological Evaluation of Laurel Run, Former NGK Metals Facility, Reading, PA**
**EPA ID #: PAD044540136**

Dear Mr. Bilash:

Attached are two copies of the Work Plan for the Laurel Run Ecological Evaluation for the former NGK Metals facility located in Reading, Pennsylvania. Environmental Standards, Inc. (Environmental Standards) prepared this Work Plan on behalf of NGK Metals. The Work Plan presents an approach for the assessment of the general habitat quality of Laurel Run in the vicinity of the former NGK Metals facility. The proposed evaluation involves direct measurements of the biological community as well as chemical analysis of surface water and sediment combined with a screening level ecological risk assessment. Details of the manner in which these measurements will be obtained are contained in the attached Work Plan document.

Please do not hesitate to contact me if you have any questions regarding the information presented in the attached Work Plan. I can be reached at 610-935-5577 or kzvarick@envstd.com. I look forward to receiving your approval to conduct this work and working with you on this project.

Sincerely,

Kathy Zvarick

Kathy Zvarick, M.S.
Manager, Risk Assessment Services

Attachments

cc: Ms. Lynne Woodside, NGK Metals
Mr. Wayne Reiber, Cabot Metals

1140 Valley Forge Road P.O. Box 810 Valley Forge, PA 19482-0810 **Tel:** 610.935.5577 **Fax:** 610.935.5583 **Web:** www.envstd.com

ENVIRONMENTAL STANDARDS
Setting the Standards for Innovative Environmental Solutions

# WORK PLAN

# LAUREL RUN ECOLOGICAL EVALUATION

## FORMER NGK METALS FACILITY
## READING, PENNSYLVANIA

**EPA ID #: PAD044540136**

May 19, 2009

Prepared for:

**NGK Metals Corporation**
917 US Highway 11 South
Sweetwater, TN 37874

Prepared by:

**Environmental Standards, Inc.**
1140 Valley Forge Road
PO Box 810
Valley Forge, PA 19482-0810

## 1.0 Introduction

On behalf of NGK Metals Corporation (NGK Metals), Environmental Standards, Inc. (Environmental Standards) will be conducting an ecological evaluation of the reach of Laurel Run proximal to the former NGK Metals Reading, Pennsylvania, facility. This Work Plan details the tasks that will be undertaken to conduct an ecological assessment of Laurel Run pursuant to the existing Consent Order with the United States Environmental Protection Agency (US EPA).The assessment will primarily focus on potential impacts to Laurel Run, the small stream that parallels the downgradient southern boundary of the former NGK Metals site (Figure 1). Specifically, the ecological assessment will involve an evaluation of surface water quality, sediment quality, and biota to determine if historical operations at the NGK Metals facility have resulted in unacceptable adverse impacts on the biological communities in the stream as determined by US EPA guidance.

The former NGK Metals facility is located on Tuckerton Road in Muhlenberg Township, Berks County, Pennsylvania. The 65-acre site is located approximately 4 miles north of Reading and is bordered on the north by Tuckerton Road, on the south by Water Street, on the east by railroad tracks, and on the west by PA Route 61 (Pottsville Pike). Laurel Run is located to the south and runs parallel to Water Street in the vicinity of the site. The site itself is generally flat with a slight slope to the south-southwest toward Laurel Run. Laurel Run flows southwest to its confluence with the Schuylkill River approximately 2 miles downstream.

Industrial activities at the site began prior to 1935 when the facility was operated by the Pennsylvania Malleable Iron Company. NGK Metals purchased the property in 1986. Between 1936 and 2000, the facility was involved in the manufacture of beryllium products, primarily beryllium-containing alloys. Prior to 1965, production activities also included the extraction of beryllium hydroxide from beryl ore. Historically, waste water from the plant was discharged to Laurel Run. The plant ceased operations in 2000 and remains vacant at this time.

Numerous ecological evaluations of Laurel Run were conducted between 1971 and 1992., as listed below.

> Human Health Evaluation and Ecological Assessment NGK Metals Corporation Reading Facility. Dunn Corporation, Mechanicsburg, Pennsylvania. February 1992.
>
> Stream Community Assessment, Laurel Run Berks County, Pennsylvania. RMC Environmental Services, Inc. Spring City, Pennsylvania. September 1991.
>
> Aquatic Biology Investigation, Laurel Run, Berks County, Tributary to Schuylkill River. Pennsylvania Department of Environmental Resources, Harrisburg, Pennsylvania. March 21, 1991.
>
> Biological/Chemical Stream Survey, Laurel Run Berks County. Pennsylvania Department of Environmental Resources. Division of Environmental Analysis and Support. Harrisburg, Pennsylvania. January 26, 1989.
>
> Report on the Aquatic Study of Laurel Run, NGK Metals Plant. BCM Engineers. Plymouth Meeting, Pennsylvania. May 1989.

A Survey of Fishes in Laurel Run in the Vicinity of the NGK Metals Plant. Environmental Research and Consulting, Kennett Square, Pennsylvania. February 1989.

Laurel Run Biological Assessment. Pennsylvania Fish Commission Division of Environmental Services. Harrisburg, Pennsylvania. February 1989.

Chemical and Biological Survey. Pennsylvania Department of Environmental Resources, Harrisburg, Pennsylvania. February 1982.

Chemical and Biological Survey. Pennsylvania Department of Environmental Resources, Harrisburg, Pennsylvania. June 1980.

Effects Discharges from Temple Quarry, Prestolite, and Kawecki-Berylco had on Laurel Run. Pennsylvania Department of Environmental Resources, Harrisburg, Pennsylvania. September 1971.

The ecological evaluation proposed to be performed by Environmental Standards will serve to provide an updated, current assessment of the ecological conditions in the reach of Laurel Run adjacent to the former NGK Metals facility. A two-pronged approach to the ecological assessment is proposed. The biological community will be directly assessed by the collection and analysis of aquatic biota (macroinvertebrate and fish) from Laurel Run. Additionally, impacts to Laurel Run will be assessed using chemical analysis of surface water and sediment samples to be used in a screening-level ecological risk assessment. A more detailed discussion of these approaches follows.

## 2.0 Biological Analysis

### 2.1 Biota Sampling

Field team members will collect a total of three biota samples from pool riffle sequences at each designated location – one upstream of the site, one sample at the site, and one downstream from the site. Water depth (when applicable) will be measured with either a ruler or a lead line (with a flat disk attached to its bottom) or other appropriate device, at each station and recorded in the field logbook. Sample locations will also be documented with photographs. The exact locations of the sampling stations will be determined in the field by the field team leader. An attempt will be made to revisit locations sampled historically to the extent those locations can be identified, accessed, and currently meet the characteristics necessary for the adequate collection of biota.

#### 2.1.1 Benthic Macroinvertebrates

Riffle species will be collected from at least one riffle segment at each sample location. Representative samples will be collected using either a kick net with 500-µ mesh or a Surber® sampler and collecting three discrete samples. The discrete samples will be combined to represent one composite sample for each sample location.

Pools located immediately adjacent to the selected riffle areas will be sampled using a kick net or Surber sampler. Three discrete samples will be collected and collated to represent one composite sample for each pool at the sample location.

Leaf packs will be collected from riffle areas and placed in a separate container but will be collected in such a manner to be representative of the sample location specified.

Macroinvertebrate samples will be field-cleaned of rubble, excess detritus and large predators will be separated from foragers. Samples will be field-preserved with a solution of approximately 10% ethanol and sent to the laboratory for sorting and identification.

#### 2.1.2 Fish

Forage fish – Fish species will be field-collected using either a D-frame net or a backpack electro fisher (Smith Root Model LR 24, battery powered) and a D-frame net. Field conditions at the time of sample collection will dictate the preferred collection device(s). Fish will be captured and measured; notations will be made to document any observed lesions, growths, or other signs of marginal health in individuals.

A cyprinid species, either black nose dace (*Rhinichthys atratulus*) or creek chub (*Semotilus atromaculatus*) or blunt nose minnow (*Pimephales sp.*), will be the primary forage fish target species. The target size class will be 2 - 8 centimeters (cm). The primary target species will be selected in the field based on the relative abundance of the candidate species at the proposed sample locations. The other two species will be potential alternatives if the primary target is not captured at other stations.

Sunfish (*Lepomis sp.*) will be the secondary target forage fish species. The target size class will be 6 - 12 cm. Sucker (*Catostomus commersonii*) will be the alternative secondary target forage fish species, in the event *Lepomis* are not captured at any station.

Whole body composite samples, with a minimum mass of 50 grams per sample, will be collected. A scientific collection permit will be obtained for this activity from the PA Fish and Boat Commission. While it is desirable to sample the same species throughout the study area, local variations in species diversity and habitat limitations may preclude this collection goal. In the event that none of the target species is present at any station, the field team will attempt to collect the most abundant observed fish species.

Electro fishing and netting using D-frame pole nets and trapping will be used to collect fish species. Each of these alternative techniques is likely to produce different species of fish for analysis. The following information will be recorded as soon as possible after sample collection for each individual fish sample collected:

- Species identification
- Total length
- Presence of grossly visible abnormalities (lesions, poor overall health, *etc.*)

### 2.2 Biota Sample Evaluation

Species diversity of macroinvertebrates will be evaluated and compared to previous studies. The Biotic Index will be comparatively evaluated to determine if the stream health has declined or improved since the previous sample collection event. Additionally, the EPT (Ephermoroptera, Plecoptera, Tricoptera) ratio may be used to compare current stream health as indicated by the biodiversity within the stream reaches. Fish species collected will be compared to previous studies to identify any population shifts or declines, relative species abundance, and increases or declines in the number of distressed or diseased individuals.

## 3.0 Chemical Analysis and Risk Assessment

### 3.1 Surface Water and Sediment Sample Collection

Chemical analysis of surface water and sediment will coincide with proposed upstream, in stream, and downstream sample locations for biota samples. The exact number and locations of samples presented herein is subject to revision based on findings in the field at the time of sample collection. Surface water and sediment sample locations will be collocated with biota samples when possible. Unfiltered surface water samples will be appropriately preserved, packed on ice for shipment, and submitted to Lancaster Laboratories, Inc. (Lancaster Laboratories) in Lancaster, Pennsylvania, under chain-of-custody for analysis of copper, beryllium, fluoride, and chromium. The surface water samples will also be analyzed for total Kjeldahl nitrogen, ammonia, pH, total suspended solids, total dissolved solids, and hardness (as calcium carbonate).

Based on preliminary and historical observations of the stream characteristics in the study area, local depositional regimes are expected to remain relatively uniform. Much of the drainage, especially the upper reaches of Laurel Run, is of a medium-gradient stream with broad, highly eroded banks, with copious amounts of sediment. Stable depositional areas will be targeted for sampling in each reach of the stream based upon previous sampling locations. Three sediment stations are anticipated in the drainage area (*i.e.*, that is upstream, adjacent, and downstream of the site).

Study area streams that are either upstream of the influence of the site or in other drainages may be considered for baseline sediment samples if a suitable immediately upstream site is not readily accessible. Discrete samples of surface sediment will be collected at each station using a grab sampler and/or push corer, as appropriate for the local conditions. The top 2 inches of sediment will be removed and submitted for analysis. Downstream samples will be collected prior to upstream samples. Sediment samples will be shipped on ice to Lancaster Laboratories of Lancaster, Pennsylvania, under proper chain-of-custody and analyzed for copper, beryllium, fluoride, and chromium.

Stream surface water will be sampled at each station by submerging collection bottles beneath the surface until appropriate sample volumes have been collected. Downstream samples will be collected prior to upstream samples. Ideally, two rounds of water sampling will be conducted - one under low-flow conditions and one under high-flow conditions. Rainfall records for the area indicate that the highest average rainfall occurs during the months of April and May; however, the stream flows may be expected to be high after any significant rainfall event. The lowest average rainfall occurs during the months of August and September; however, low flow conditions may also occur at any time of the year during dry weather. Site-specific conditions and schedules will determine if two rounds of surface water samples can be collected.

### 3.2 Screening-Level Ecological Risk Assessment

A screening-level ecological risk assessment (SLERA) will be conducted to determine if analytes identified in surface water and sediment in Laurel Run, if any, exceed respective screening-level toxicity values for fish and benthic invertebrate species identified in the study area.

The SLERA will be conducted in accordance with the procedures recommended in the following US Environmental Protection Agency (US EPA) documents:

> *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (US EPA, 1997).
>
> *The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments* (US EPA, 2001).

The SLERA will consist of a two-step approach. The first step will incorporate a screening-level problem formulation and evaluation of ecological effects; the second step will focus on estimation of screening-level exposure and calculation of hazards to species of concern.

For Step 1 of the SLERA, a site conceptual model will be developed based on the information collected from historic documentation (*e.g.*, Dunn Corp, 1992) as well as the 2009 sampling effort at the Laurel Run study area. The site conceptual model will consider the environmental setting in addition to the physicochemical characteristics of detected compounds in the study area. Additionally, relevant data will be evaluated to determine if fate and transport mechanisms exist at the site as well as the mechanisms of ecotoxicity associated with the contaminants and likely categories of receptors (*i.e.*, species or guilds) that could be affected. Surface water and sediment analytical results from the study area will also be compared to results collected from an upstream area to assess stream quality relative to background conditions presumably unaffected by historical operations at the facility.

Finally, the site conceptual model will present those complete exposure pathways that might exist in the study area, and endpoints will be selected and subjected to screening for ecological risk. Assessment endpoints for COPCs (*i.e.*, chemicals identified in water and sediment in the study area) will likely include adverse ecological effects on receptors for which exposure pathways are complete. The measurement endpoints that will be used to establish the screening ecotoxicity values will be based on the available literature regarding the receptor- or guild-specific mechanisms of toxicity (US EPA, 1997). The hierarchy of screening ecotoxicity values to be used in the evaluation of ecological effects will be no-observed-adverse-effects-levels (NOAEL), lowest-observed-adverse-effects-levels (LOAEL) adjusted by a factor of 0.1, median lethal concentrations ($LC_{50}$), and median effect concentrations ($EC_{50}$). Based on the preliminary review of chemicals historically reported in Laurel Run water and sediment, it is unlikely that $LC_{50}$ or $EC_{50}$ values will be required for the evaluation of ecological effects. Screening ecotoxicity values will be collected from the following sources:

> *U.S. Environmental Protection Agency, Region 3 Freshwater and Freshwater-Sediment Screening-Level Concentrations (US EPA, 2006).*
>
> *Oak Ridge National Laboratories Ecological Benchmark Search Tool (ORNL, 2008).*
>
> *U.S. Environmental Protection Agency ECOTOX Database (US EPA, 2008).*
>
> *U.S. Environmental Protection Agency AQUATOX Software (US EPA, 2007).*

For Step 2 of the SLERA, results from Step 1 will be refined to identify any chemicals of concern (COCs) that might require a baseline ecological risk assessment (BERA). Specifically, in Step 2, the highest contaminant concentrations measured within the study area will be documented for

each medium and divided by the appropriate species- or guild-specific ecotoxicity screening values to derive an ecological hazard quotient (HQ). Based on the results of the screening risk calculation, a decision will be made to exit or continue with the ecological risk assessment. If ecological risks based on the conservative screen are acceptable (*i.e.*, if HQs are less than 1), then the site will be determined to pose an acceptable risk; however, if any HQs exceed 1, then additional analyses may be warranted.

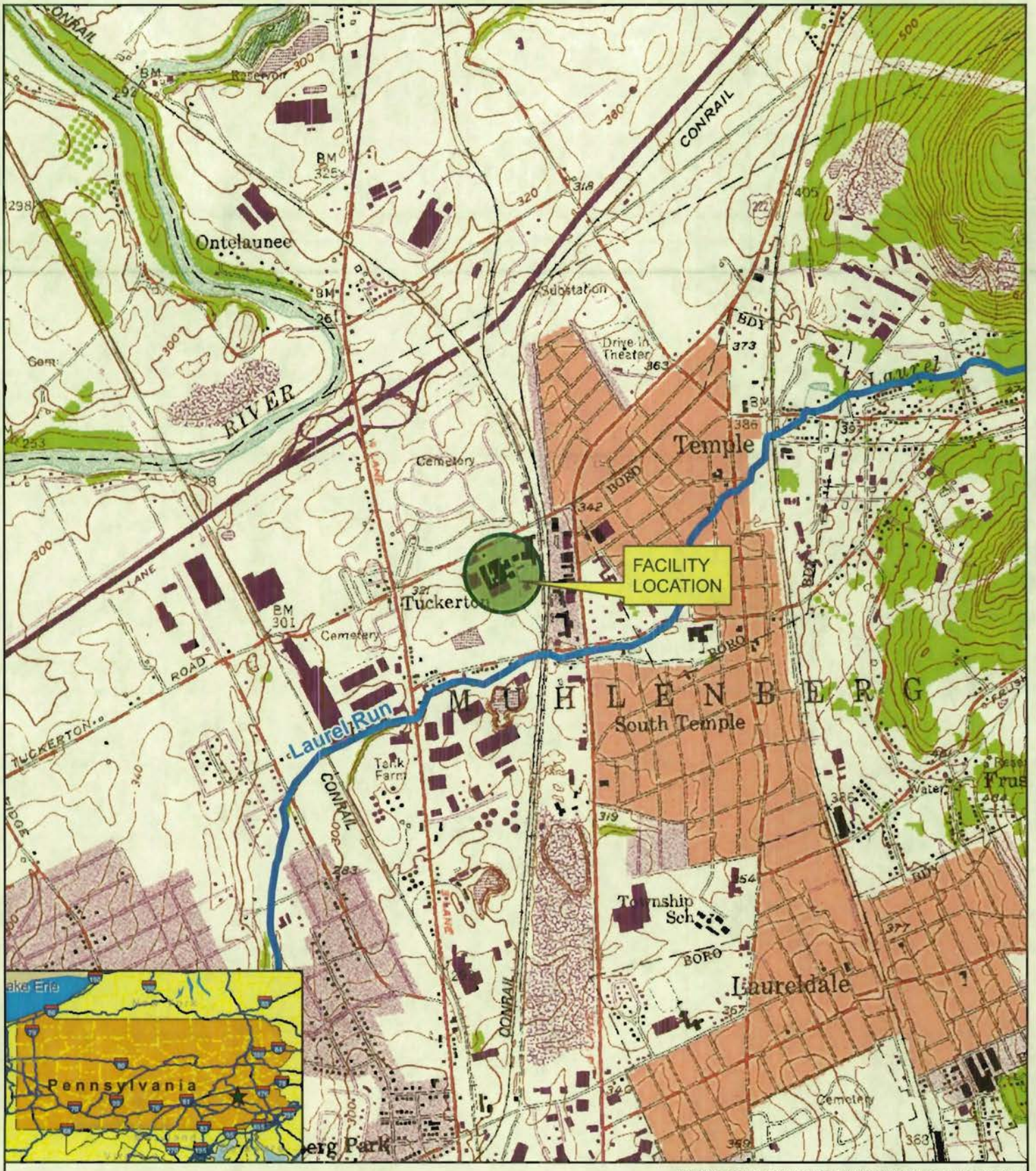
## 4.0 Reporting

A report will be provided to the US EPA describing the sampling event(s), the analyses undertaken, the results of the evaluation, and the conclusions drawn on the results. Additionally, a summary of the conclusions of historical studies (to the extent they are available) will be included. Figures, tables, calculations, laboratory reports, and other pertinent information will be included in the report as necessary.

## 5.0 References

US EPA (United States Environmental Protection Agency). "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. " EPA/540-R-97/006. Environmental Response Team, Washington, DC, 1997.

US EPA (United States Environmental Protection Agency). "ECO Update: "The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments." EPA 540/F-01/014 Publication 9345.0-14. Office of Solid Wastes and Emergency Response. Washington, DC, June 2001.




**NGK Metals Corporation**
**150 Tuckerton Road**
**Reading, Pennsylvania**

SOURCE: U.S.G.S. 7.5' TOPOGRAPHIC QUADRANGLE; TEMPLE, PA; 2001

| DATE: | PROJECT NO.: | FIGURE 1: TOPOGRAPHIC SITE LOCATION MAP |
|---|---|---|
| April 17, 2009 | 20095322.A | |
| ENVIRONMENTAL STANDARDS | DRAWN BY: SMG / APPRV'D BY: NONE | |
| | CHEK'D BY: NONE / REVISION: 0 | NGK METALS CORPORATION BERKS COUNTY, PENNSYLVANIA |

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